The Rufford Foundation
Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Dedan K. Ngatia
Project title	Conserving carnivores in Kenya: Addressing disease dynamics in domestic dogs (*Canis lupus familiaris*) in rural Communities
RSG reference	18445-1
Reporting period	1 year
Amount of grant	£4988
Your email address	Dedan.ngatia@gmail.com
Date of this report	23rd November 2016

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To investigate variation in the spatial ecology of domestic dogs in Laikipia			Yes	A total of 50 individual dogs were fitted with GPS collars for 11 months although only spatial data from 46 dogs was used for the analysis.
To determine how the roles performed by domestic dogs shape their movement patterns			Yes	Dogs in Laikipia are mainly used for protecting homesteads and herding, according to our results. Here, movement patterns between the two categories of dogs were compared.
To investigate the parasites and diseases carried by domestic dogs in Laikipia		Yes		Blood samples collected have not yet screened for pathogens since this cannot be done inside the country (Kenya). I have formed collaboration with Cornell University who will help with this at a reduced cost. There are limited resources in guidance to identification of fleas (no guidebook to fleas of East Africa, Kenya etc) but Dr Dino Martins, Director Mpala Research Centre, has promised to assist in this.
To examine how different movement patterns of domestic dogs influences their parasites/diseases		Yes		The above sentiments affect fulfilment of this objective as well. All the same, different movement patterns were compared with abundances of ticks and fleas and also differences tested between the categories of dogs as I await further processing of the samples.
Rabies Vaccination of all community dog			Yes	The first round of vaccination, using support from Rufford, was successful with

at Koija and Il Motiok				a total 821 dogs vaccinated against rabies at Koija and Il Motiok And also in other three community ranches namely; Maramoja, Endana and Jua Kali. Building upon this work, we successfully vaccinated over 4,000 domestic dogs across 10 communities in 2016.
Rabies education programme at Koija and Il Motiok			Yes	12 primary schools within Laikipia were involved with this in collaboration with the Conservation Clubs of Laikipia. Outreach included asking primary school students to draw panels for educational posters on rabies treatment and control. Awards in the form of books were provided to all participants plus additional art supplies for artists whose panels were selected for inclusion in the final poster. Awards were passed out during Mpala Education day at Kimanjo Laikipia and posters distributed to primary schools across the county.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Though I expected this, a few dog owners declined replacement of the collars on their dogs with their reason being that the collars were affecting the health of their dogs (which was definitely a misconception or rather an excuse). Since having the collar on a dog or not was an owners decision, I would always retrieve the collar and put it on a new dog. Finding collared dogs, mostly herding dogs, during the day for collar replacement was a challenge since the dogs would spend the whole day out in the field but we tackled this by visiting the respective homesteads early in the morning or late in the evening. At first, language barrier was a little bit of a problem but it was always easy to work around this since as I always hired local assistants but over time I also learned some of the crucial and important words and vocabularies. Lastly, screening of the blood samples within the country for specific pathogens has not been possible but after establishing collaboration with Cornell University, I am hoping that this will happen soon.

3. Briefly describe the three most important outcomes of your project.

Within the period of 1 year, I have managed to gather spatial data from 46 domestic dogs in two communally owned ranches where after the analysis, I can explicitly tell a story on the movement patterns of dogs inside and outside conservancies which is key to conservation of wild carnivores, especially when one considers domestic dogs roles in disease transmission. Furthermore, from the support by Rufford, I have managed to collect a huge dataset on parasites, mostly tick and fleas, from the dogs not forgetting the blood samples and this has and will continue to help us make deductions on the impact of movement ecology on parasite/disease ecology by domestic dogs.

Within the 1 year of funding, I planned a vaccination program with support from Mpala Research Centre and my main supervisor Dr Adam Ferguson. Though the initial plan was to vaccinate approximately 500 domestic dogs from the two communities where I was working, we ended up conducting this activity in a total of five community ranches (Koija, IL Motiok, Endana, Maramoja and Jua Kali) where we successfully vaccinated a total of 821 dogs against rabies. The funds from Rufford assisted in this pilot study which caused and attracted interest from different stakeholders including International Livestock Research Institute, County Government of Laikipia, Karatina University, African Network for Animal Welfare, the national Zoonotic Disease Unit and the surrounding conservancies. As a result of their interest and collaboration, just a few days ago, we conducted our second Laikipia Rabies Vaccination Campaign and we managed to vaccinate a total of 4530 animals (dogs and cats).

Twelve primary schools benefited from the education programme supported by rabies and I did this in collaboration with Nancy Rubenstein who runs the 12 conservation clubs of Laikipia. In this program, we had both poster presentations and active lectures in the respective schools on rabies and the kids also participated in a drawing competition all meant to raise their awareness on rabies.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

I ended up hiring six research assistants for the whole 12 months period who were critical to the successful completion of my work and while the project was ongoing, I used to give incentives to the all the owners of the dogs on a monthly basis. During the vaccination campaign, we hired 10 individuals who worked with us on a daily

basis for the whole vaccination period. Vaccinating domestic dogs in this region will really help in curbing the spread of rabies in this region meaning that people can peacefully coexist with their livestock even considering their close proximity to wildlife. Through the education programme, we made people more aware of what rabies is, how fatal it is, how it spreads, how to handle dogs, what measures to take in case of dog bites or in case of a rabid dog etc and this has been observed as a key step in eradicating rabies even with further planned vaccinations.

5. Are there any plans to continue this work?

Yes. First I am extremely excited that that my work on dogs has become the genesis of an exclusively vital project on rabies vaccinations which will go a long way in curbing the spread of rabies, further helping people to live peacefully with both livestock and wildlife. We are hoping to further the vaccinations by increasing its scope and coverage and there is a great future with the vaccinations considering the level of partnership we are currently forming and I am also confident that Rufford will always be our partner, now and in the future.

Although we have enough data on spatial patterns, parasites and diseases, there still exists a gap in understanding the demographics of domestic dogs in these rural areas and this, combined with better understanding of the social behaviour of domestic dogs, would really supplement my concluded work on spatial and disease ecology. This would be important in taking us closer to linking movement, demographic, behaviour and other social aspects with parasites and diseases. More and continued education is as well necessary and although we deeply concentrated with kids at school in my last study, it would also be critically important to consider educating older people to create a uniformly informed community.

6. How do you plan to share the results of your work with others?

I have plans in place to publish my first paper on the spatial patterns of domestic dogs, in a peer reviewed journal, by the end of this year. So far, I have presented my preliminary work in three international and two national conferences, including twice in the United States and I have given multiple talks both outside and inside the country e.g. in Germany, USA and to visiting guests at Mpala Research Centre. I plan to give more talks, prepare one more manuscript on parasites and disease and always provide hard and soft copies of reports of my work to different stakeholders who might need them.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

The grant was used for 11 months and this was meant to be the actual length of the project.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Item	Budgeted Amount	Actual Amount	Difference	Comments
iGotU data loggers	1555	1710	-155	An extra five more loggers were ordered to cater for any logger that would malfunction, get lost etc
Data logger housing	173	173	0	Exact number logger housing was ordered as requested in the budget
Collars	173	173	0	Exact number collars was ordered as requested in the budget
Muzzles	31	25	6	10 pieces were ordered as budgeted but at a cheaper cost
Water jugs for participants	63	63	0	All dog owners were awarded with water jugs at the start of the project
Leashes	31	31	0	
Assistant Salaries (Monitoring dogs)	376	376	0	
Petrol	965	965	0	
Syringes	45	45	0	
Needles	15	15	0	
Other lab supplies	63	63	0	
Vaccines	480	600	-120	I ordered a total of 1000 doses as opposed to the proposed 800. This difference was covered by Mpala Research Centre

Cooler for vaccines storage	157	157	0	
Assistant salaries (during collaring and vaccinations)	225	375	-150	I had proposed to use 6 assistants in this but I raised the number to 10 since the rabies vaccinations was more tasking and needed more labour
Veterinarian allowances	376	564	-188	Same here, I had to raise the number of the vets to 6 from 4 (by 2) to help with the vaccinations
T-shirts	150	150	0	
Posters	25	25	0	
Banners	60	60	0	
Writing pads and pens	25	25	0	
TOTAL	4988	**5595**	-607	

The difference mainly arose from the vaccination campaign and it was kindly covered by Mpala Research Centre in their support to the vaccinations.

9. Looking ahead, what do you feel are the important next steps?

I would encourage more studies inclined to a deeper and a better understanding of the demographics and the social ecology of domestic dogs in these regions. Also, apart from rabies vaccinations, it would be important to conduct studies on the rabies burden and surveillance in these communities while at the same time examining the level of awareness of the people on rabies and this would be a perfect way of testing on the impacts of the education programme.

As observed from my work, six of the collared domestic dogs were killed inside community lands, four preyed on by leopards and two killed by hyenas. This competes with my former hypothesis of predominantly dogs visiting the conservancies and creates new questions on how wild carnivores moving into community lands might affect disease/parasite transmission patterns. With this knowledge, it would be important to conduct a surveillance study of visitations by wild carnivores in these lands which will help us get more information on what percentage of dogs is being killed by these carnivores and this will further our knowledge on interactions between the two categories of carnivores. Furthermore, apart from using GPS collars, it would also be helpful to conduct random surveys in the conservancies and GPS mark every location where a domestic dog is observed. The main reason behind this is that, within my one year of study, I have personally

observed domestic dogs in deeper parts of the conservancies than recorded using my GPS collars which basically means that we might be missing some data on how far domestic dogs penetrate into the conservancies.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

I used the RSGF logo in all the posters and banners that I produced during both the education programme and the rabies vaccinations. In addition, I have always had the logo in all the presentations and talks that I have made and I plan to continue with the same. I will also ensure that this logo appears at the front page of my final report and my published work**.** Finally, the Rufford logo appeared on our Laikipia Rabies Vaccination Campaign posters which were prominently displayed during vaccination efforts across several communities.

11. Any other comments?

I thank the RSGF for supporting this work and just to let you know, you have enabled me to collect a data set which has never been collected before in the whole of Africa. Also, you have laid the groundwork for spectacular studies on a system and species where less work has been done and where a huge gap exists.

Lastly, what was meant to be 'just community outreach' funded by Rufford has grown to become one of the largest vaccination campaigns in Kenya and I highly appreciate RSGF for availing funds to conduct a pilot study on this and I hope and promise to always involve and acknowledge RSGF in all our rabies vaccinations, now and in the future.